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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,105	09/24/2003	Eit Drent	TS1102 (US)	8177

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EXAMINER	
LAO, MARIALOUISA	
ART UNIT	PAPER NUMBER
1621	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/670,105	DRENT ET AL.	
	Examiner	Art Unit	
	MLouisa Lao, Ph.D.	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 27-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-20 and 27-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/24/03 1/9/04 9/21/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicants' arguments in pages 6-8 under Remarks and Amendments to the claims in pages 2-5, filed January 8, 2007, with respect to claims 1-20 have been fully considered, as follows:

The rejections of claims 1-3, 5 and 9-15 under Section 102(b) have been withdrawn.

The objections to claims 8-9 and 17-19 have been withdrawn.

The amended claims 12-14 are acknowledged.

New claims 27-31 and the cancellation of claims 21-26 are acknowledged.

2. Applicants' arguments of the rejections of claims 1-15 under Section 103(a) are acknowledged.

Applicant stipulates that the instant application requires the use of a diphosphine ligand which incorporates a bivalent optionally substituted bridging group which is connected to each phosphorus atom by an sp^2 hybridized carbon atom. Applicants further point out that an sp^2 hybridized carbon atom is defined at the top of page 3 of the specification as a carbon atom involved in a double bond, as in ethylene.

3. Applicants contend that reference WO`250 cited *simply does not disclose* any diphosphine ligand having a bivalent bridging group which is connected to each phosphorus atom by an sp^2 hybridized carbon atom; nor does the reference's examples of a number of "preferred bidentate diphosphines of formula I1" starting at the bottom of page 9 and carrying over onto page 10 incorporates a bridging group wherein even one phosphorus atom is connected

to an sp2 hybridized carbon atom. Further, applicants state that none of the bidentate diphosphine ligands used in the examples have a connection of a phosphorus atom to an sp^2 hybridized carbon atom. The reference to data purporting to the efficacious tolerance of the bidentate of the present invention over prior art's is also acknowledged.

Albeit the first Office Action mailed 10/20/06 failed to expressly address the carbon atom hybridization of the bridging R-groups; and in the interest of **sustaining the rejection of the claims under 35 USC § 103(a)**, it is now explicitly stated that WO`250 does teach (emphasis added), but does not exemplify explicitly the verbiage of sp^2 hybridized carbon atoms in the bridging group.

4. As stated in the previous Office Action, WO '250 art teaches R is a bivalent organic bridging group and "...can comprise optionally substituted or non-substituted saturated or ***non-saturated aliphatic ring structure***, such as for example a substituted or non-substituted **cyclopentene**...". See lines 14-35 page 6 continued to lines 1-17 page 7 and lines 23-30 page 8 continued to lines 1-31 page 9.

5. More specifically, addressing the **recitation of the claims** and the corresponding **disclosure of WO`250** are as follows:

a) claims 1, 2, 4, 5, 6, 7

In WO`250, lines 14-15 page 6, "preferably, the bridging group R represents an alkylene group.."

- in lines 25-28 page 6, "optionally substituted saturated or non-saturated aliphatic ring structure, such as for example a substituted or non-substituted cyclopentane, **cyclopentene**,

cyclohexane or **cyclohexene."**

- in lines 34-35 page 6 bridging to lines 1-10 page 7, "if the connection forms part of an optionally substituted or **non-saturated** aliphatic ring structure, the phosphorus atoms are preferably attached at adjacent positions..." , "...connection is an **ethylene group**...".

Cyclopentene, cyclohexene and ethylene are typical homologues that have sp^2 hybridized carbon atoms.

6. It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize compounds that are substituted or non-substituted saturated or non-saturated aliphatic ring structure, since these are bridging groups with sp^2 hybridized carbon atoms that are likewise functional that work with disphosphine ligands.

7. One having ordinary skill in the art would have been motivated to use an alkene, like cyclopentene or ethylene, since these compounds typify non-saturated structures, which have sp^2 hybridized carbon atoms, as taught by WO`250 and the artisan would have reached a reasonable expectation of success with the process incorporating said bridging groups in a diphosphine ligand-catalyst system.

b) claims 8, 9, 10, 11

In WO`250, in lines 14-15 page 8, X^1 and X^2 independently represent a substituted or non-substituted symmetrical phospha-bicycloalkyl group...

- in lines 22-23 page 8,...preferred are ... phospha-bicycloalkyl group with at least 7 ring atoms...
- in lines 5-13 page 9, ...preferred 9-phosphabicyclononyl groups...

Phospha-bicyclononyl represents phospha-bicycloalkyl group where there are nine carbon atoms per ring.

8. It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize phospha-bicyclononyl since these have at least 6 carbon atoms per ring or have 6-12 carbon atoms per ring that are likewise functional that work with R-bridging groups.

9. One having ordinary skill in the art would have been motivated to use a dual ring compound with nine carbon atoms per ring, such as phospha-bicyclononyl, since these compounds typify X^1 and X^2 independently a phospha-bicycloalkyl group, as taught by WO`250 and the artisan would have reached a reasonable expectation of success with the process incorporating said disphosphine compounds in a diphosphine ligand-catalyst system.

c) **claims 12, 13, 14, 15**

In WO`250, lines 33-35 page 10 bridging to lines 1-7 page 11... sources of Pt group metal cation catalyst systems are platinum or palladium ...palladium (II) acetate and platinum (II) acetylacetonate...

Platinum and palladium are both metals, which belong to Group VIII and as salts are sources of Group VIII metal cations.

10. It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize palladium (II) acetate and platinum (II) acetylacetonate since the Group VIII metal cations are found to work by WO`250 as effective catalysts.

11. One having ordinary skill in the art would have been motivated to use palladium (II) acetate and platinum (II) acetylacetonate, since these compounds typify the source of Group VIII

metal cations, as taught by WO`250 and the artisan would have reached a reasonable expectation of success with the process incorporating said catalysts in a hydroformylation process.

d) **claims 16, 17, 18, 19, 20**

WO`250 lines 16-21 page 12...the ethylenically unsaturated compound is an alkene having 2-20 C atoms per molecule.

In lines 30-34 page 12... the examples of ethylenically unsaturated compounds include *inter alia,* hexenes, dodecenes....

Hexenes, dodecenes are ethylenically unsaturated compounds, which are alkene homologues that have C atoms between 4-40.

12. It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize hexene or dodecene since these alkene homologues are ethylenically unsaturated compound, which are found to work by WO`250 as effective catalysts.

13. One having ordinary skill in the art would have been motivated to use hexene or dodecene, since these compounds typify ethylenically unsaturated compounds, as taught by WO`250 and the artisan would have reached a reasonable expectation of success with the process incorporating said catalysts in a hydroformylation process.

14. Thus, it is *prima facie* obvious that the instant claims 1-2 and 4-20, as recited, are unpatentable.

15. As to the **new claims 27-31**, these read on WO`250 and are rejected under 35 U.S.C. 103(a).

The basis for rejection was stated in the Office Action mailed 10/20/06 on pages 6-7.

And these were:

The WO '250 art teaches the carbonylation of optionally substituted ethylenically unsaturated compounds by reaction with carbon monoxide and hydrogen in the presence of a catalyst system including: (a) a source of Pt group metal cations, (b) a bidentate diphosphine composition, (c) an acid having pK_a less than 6 measured at 18 deg C, (d) a source of halide anions. See the abstract, claims 1-3 page 41, lines 31-34 page 11 and lines 3-8 page 14.

The WO '250 art teaches R is a bivalent organic bridging group and "...can comprise optionally substituted or non-substituted saturated or non-saturated aliphatic ring structure, such as for example a substituted or non-substituted cyclopentene...". See lines 14-35 page 6 continued to lines 1-17 page 7 and lines 23-30 page 8 continued to lines 1-31 page 9.

The WO '250 art teaches "examples of Pt group metal cations are platinum or palladium compounds". See lines 33-35 page 10 continued to lines 1-7 page 11.

The WO '250 art fails to teach that the alkenes are octenes in a mixture of octenes, octadienes, methylheptadienes, and/or dimethyl hexadienes.

Since phospha-bicycloalkyl rings are commonplace as disclosed in the prior art (Drent et al. WO-A1-01/87899 page 5 lines 1-17) as organic bridging groups and the applicants' election of the species of claim 22 wherein the R group represents a bivalent cycloalkane group, an artisan skilled in this art would have been motivated to employ the use of cycloalkanes, cycloalkenes, octenes, octadienes, methylheptadienes, and/or dimethyl hexadienes equivalent to phospha-bicycloalkyl rings as described in same type of hydroformylation or carbonylation process, the search of which requiring no inordinate degree of experimentation.

Therefore, one of ordinary skill in the art would have reasonably expected that the teachings of the WO '250 art would produce the attributes of the instant claimed process of hydroformylation.

In the same light, the bases of rejection discussed supra on the details of sp2 hybridization apply to new claims 27-31.

16. Thus it is clearly *prima facie* obvious that the instant claims 1-2, 4-20 and 27-31 are unpatentable over the teachings of WO`250.

Claim Rejections - 35 USC § 112

17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

18. **Claim 3 is rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

19. Claim 3 recites in line 2...*the same* sp^2 hybridized carbon atom, which contravenes the definition set forth for R as a bivalent optionally substituted *aromatic bridging* group. Since the purported "*the same* sp^2 hybridized carbon atom" would have to be linked to at least two other C atom in the aromatic ring ; thus the purported "*the same* sp^2 hybridized carbon atom" fails to satisfy the hybridization requirement.

20. **Claim 8 is rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention. Claim 8 in line 1 recites "*and/or*", since X^1 and X^2 is different from X^1 or X^2 and fails to set forth the metes and bounds of the claim.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MLouisa Lao, Ph.D. whose telephone number is 571-272-9930. The examiner can normally be reached on 8:30am to 5:30pm Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

`mll 02282007
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